

FIG.1

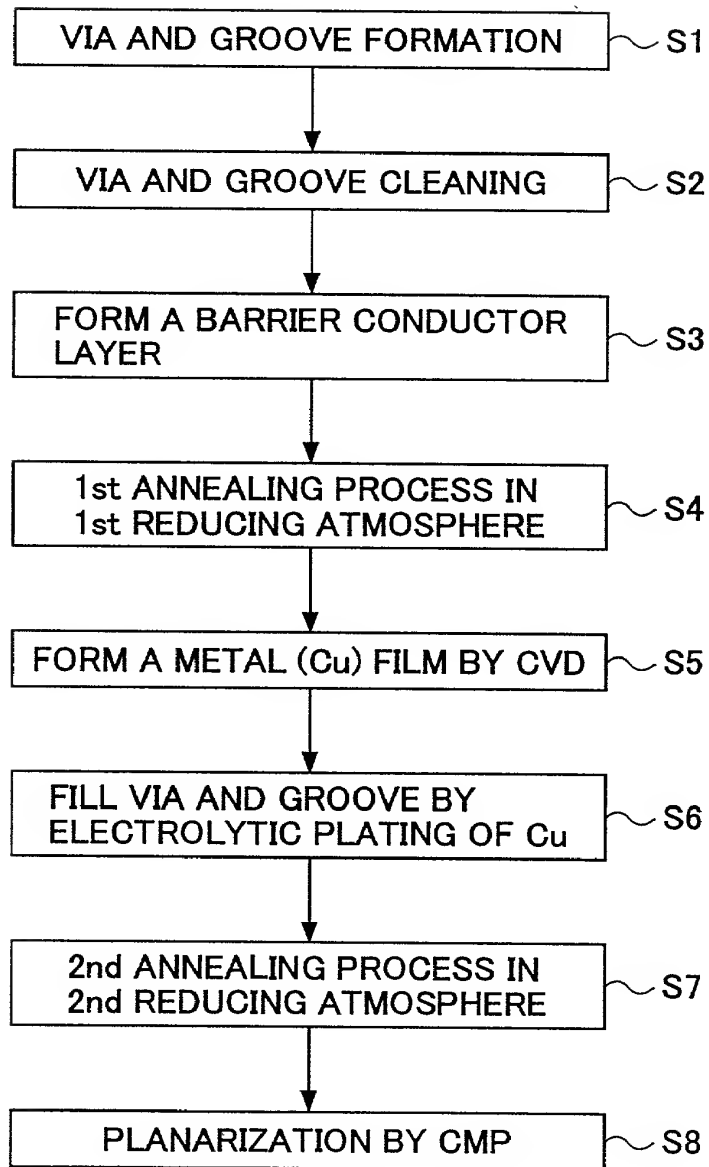


FIG. 2

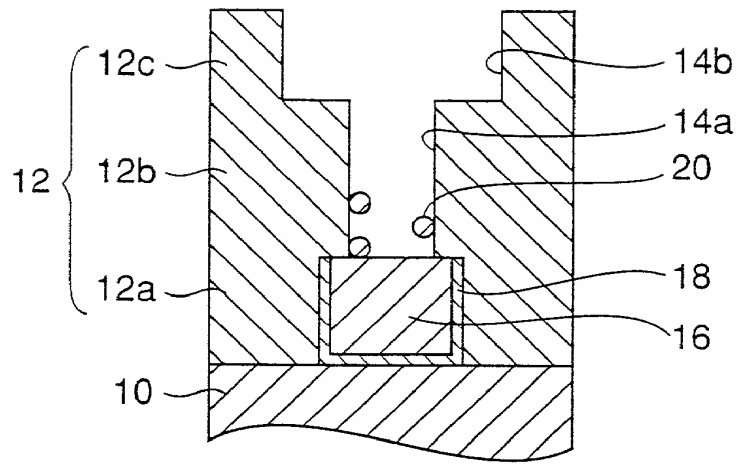


FIG. 3

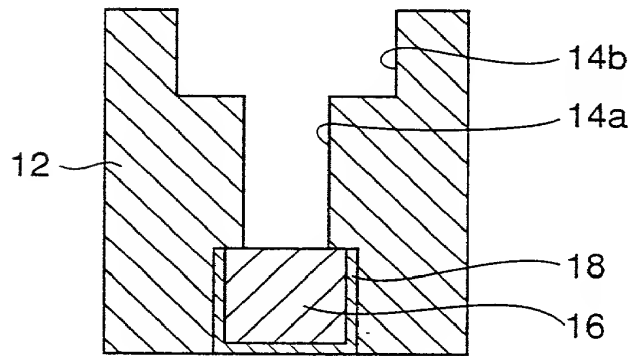


FIG. 4

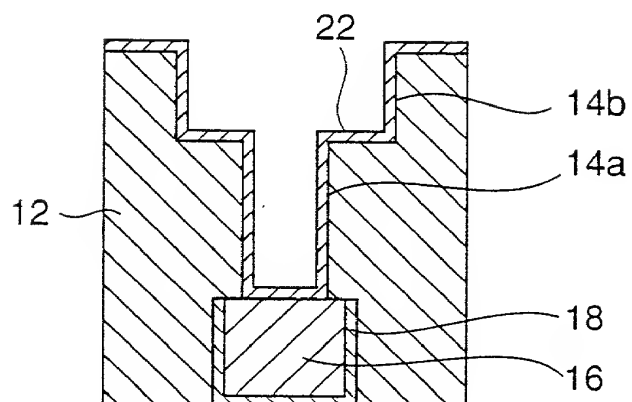


FIG. 5

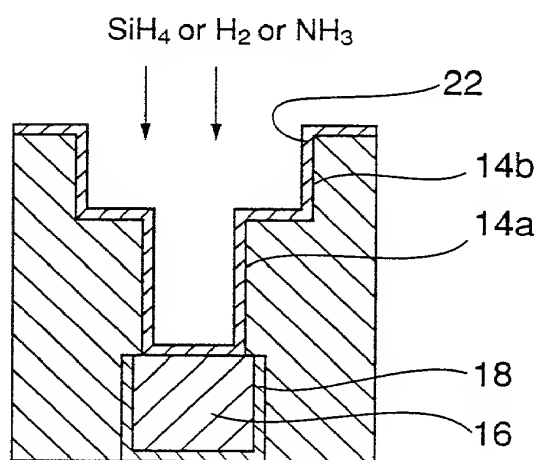


FIG. 6

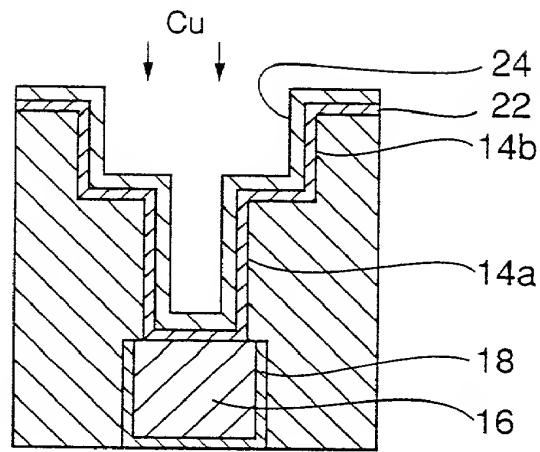


FIG. 7

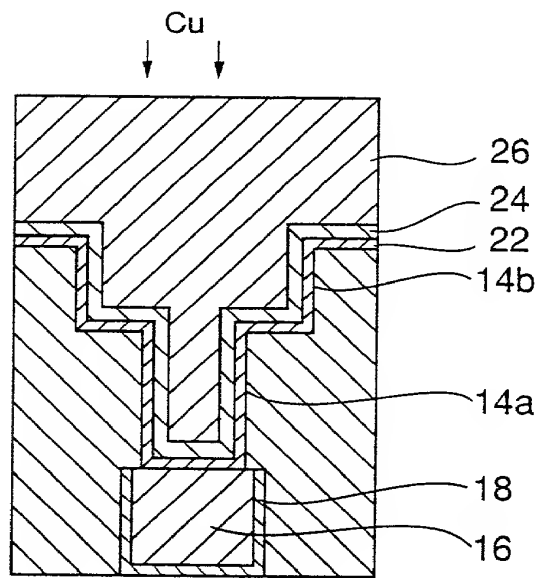


FIG. 8

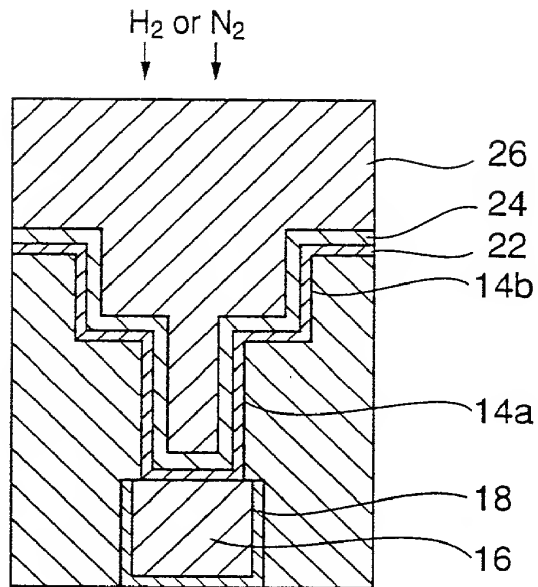


FIG. 9

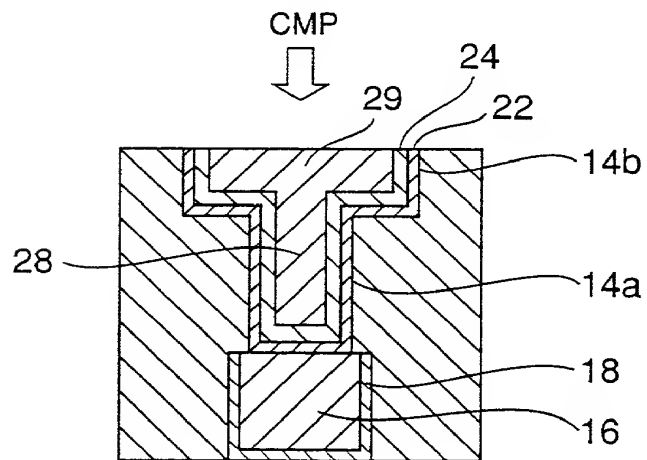


FIG.10

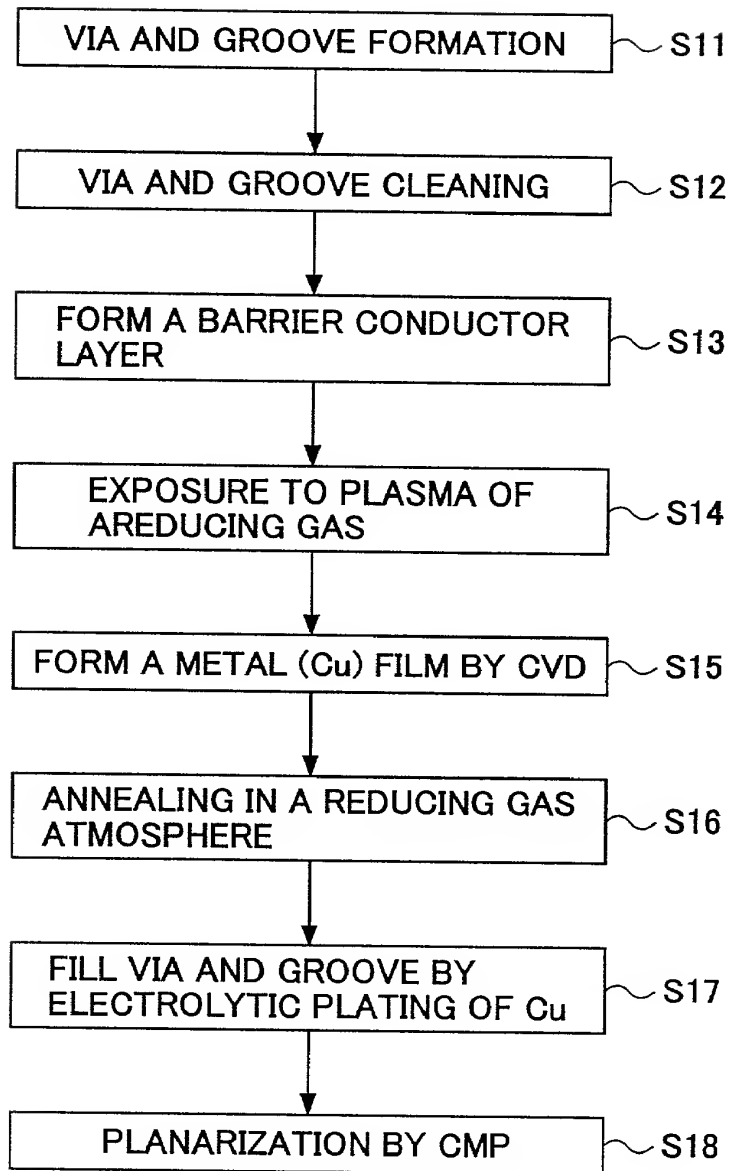


FIG. 11

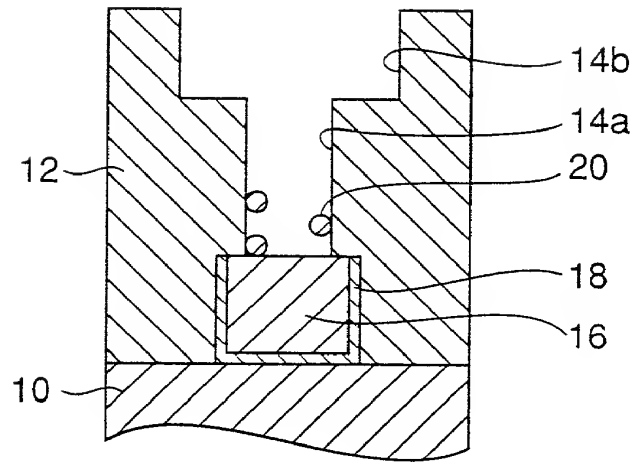


FIG. 12

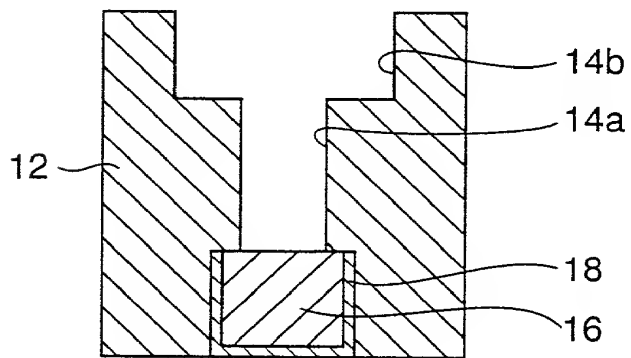


FIG. 13

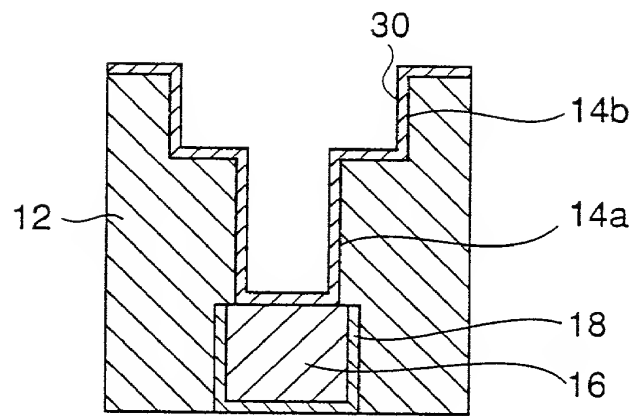


FIG. 14

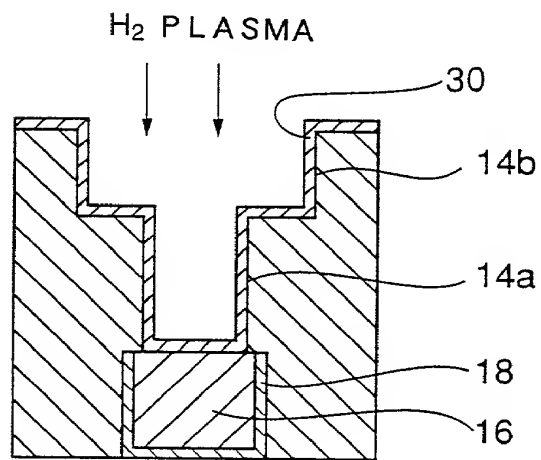


FIG. 15

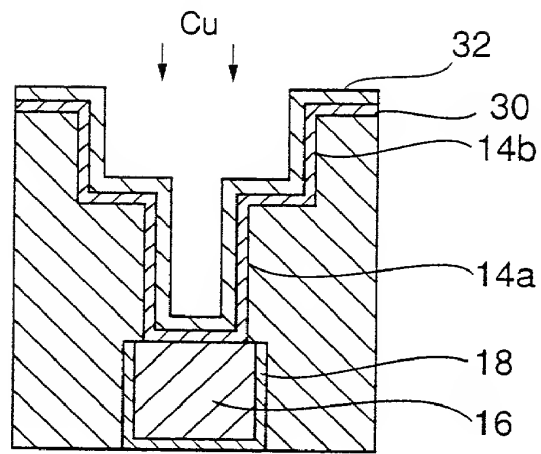


FIG. 16

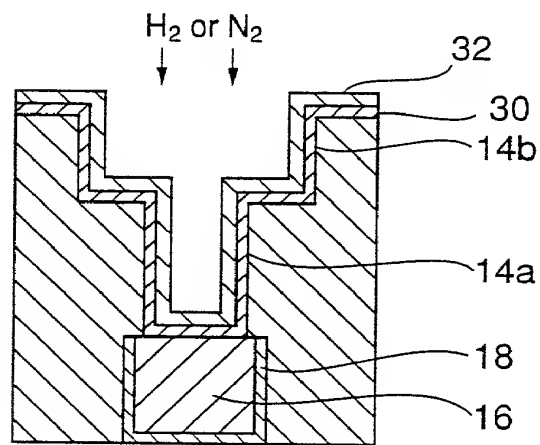


FIG. 17

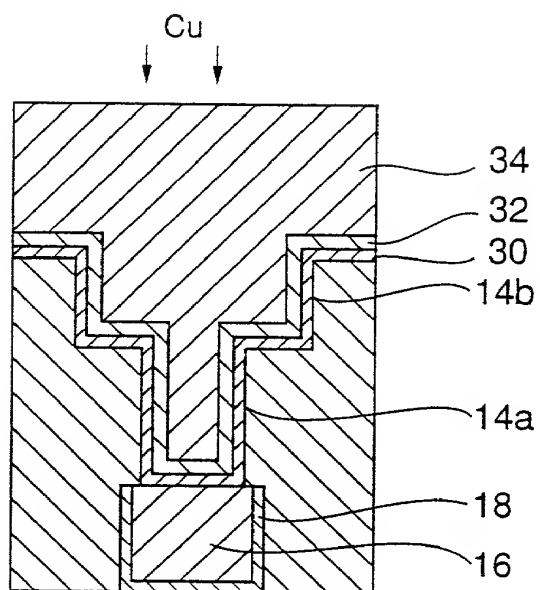


FIG. 18

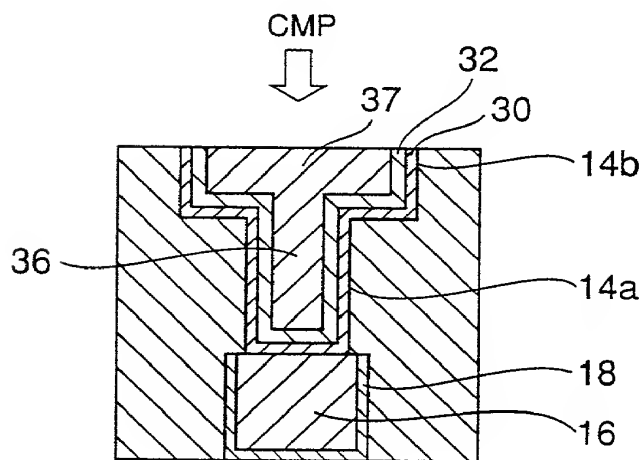


FIG.19

	BARRIER CONDUCTOR	METAL FILM	1st ANNEAL GAS	2nd ANNEAL GAS	PLASMA GAS	TAPE TEST	STRENGTH TEST (MPa)
EXP1	TaN(PVD)	Cu(CVD)	NH ₃	H ₂	—	O	68
EXP2	TaN(PVD)	Cu(CVD)	SiH ₄	H ₂	—	O	74
EXP3	TaN(PVD)	Cu(CVD)	H ₂	H ₂	—	O	69
EXP4	WN(CVD)	Cu(CVD)	SiH ₄	H ₂	—	O	64
EXP5	WN(CVD)	Cu(CVD)	—	—	H ₂	O	75
COMP1	TaN(PVD)	Cu(CVD)	—	—	—	X	31
COMP2	TaN(PVD)	Cu(CVD)	—	H ₂	—	X	44
COMP3	TaN(PVD)	Cu(CVD)	NH ₃	—	—	X	—
COMP4	TaN(PVD)	Cu(CVD)	SiH ₄	—	—	X	—
COMP5	TaN(PVD)	Cu(CVD)	H ₂	—	—	X	—
REF	TaN(PVD)	Cu(PVD) +Cu(CVD)	—	H ₂	—	O	69

FIG. 20

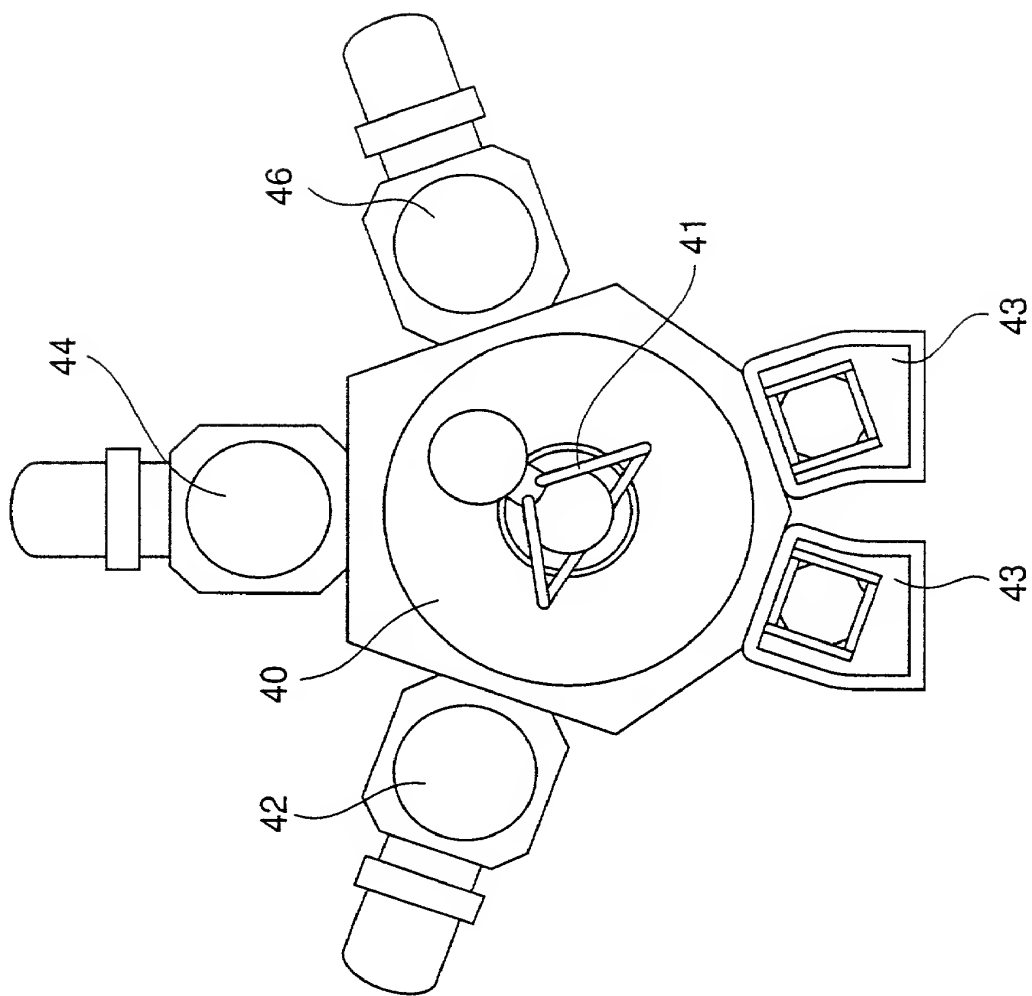


FIG.21

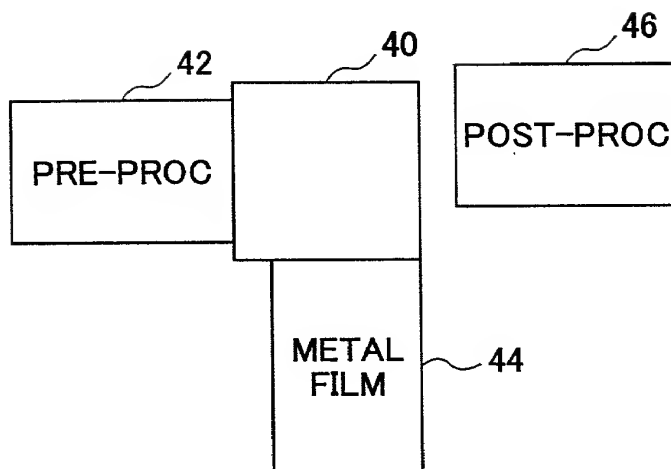


FIG.22

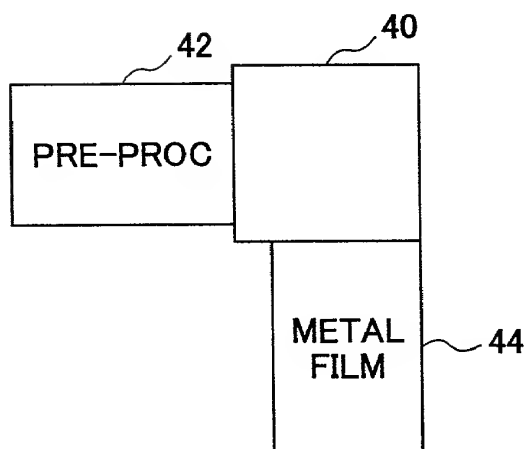


FIG.23

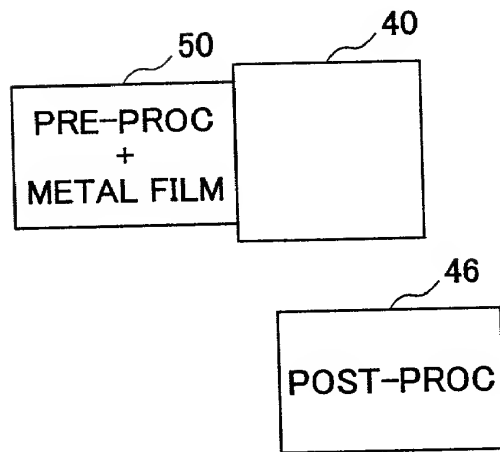


FIG.24

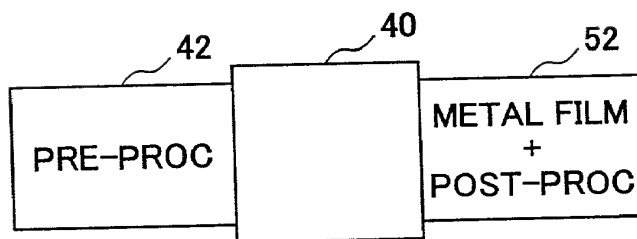


FIG.25

